

### **REMARKS/ARGUMENTS**

Reconsideration of the application is respectfully requested for the following reasons:

The present remark is in response to the Office Action mailed March 22, 2006, in which claims 1-8 and 20-26 are rejected. No claim is added or cancelled in this application. Therefore, claims 1-18 and 20-26 remain in this application.

Applicants respectfully request reconsideration in light of the following remarks.

### **CLAIM REJECTIONS- 35 U.S.C. SECTION 102(b)**

Claims 1 and 5-7 stand rejected under 35 U.S.C. 102(b) as being anticipated by Wang et al. (U.S. Patent No. 5,679,606).

Examiner is of the opinion that the Fig. 2-5 of Wang et al. '606 disclose all features of the present invention recited in Claims 1 and 5-7. The Fig. 2-6 of Wang et al. '606 disclosed a method of forming inter-metal dielectric structure, which includes providing a integrated circuit substrate (10) having metallurgy lines (14), encapsulating a protective oxide layer (20) (see Fig. 2), forming a gap-fill oxide layer (22) over the protective oxide layer (20) and etching the a gap-fill oxide layer (22) in situ but not etch through the protective oxide layer (20) and not expose the metallurgy lines (14) (see Fig. 3), repeating the protective layer and the gap fill layer steps until another protective oxide layer (24) is formed on the gap-fill oxide layer (22) (see Fig. 4), and forming a gapping cap fill layer (26) on the protective oxide layer (24) and forming a capping protective layer (28) on the gapping cap fill layer (26) to planarize the underlying layer (see Fig. 5). The object of method of forming inter-metal

dielectric structure disclosed by Wang et al. '606 is to form the inter-metal dielectric structure without damaging the inter-metal lines. Therefore, before forming a gap-fill oxide layer (22) over the protective oxide layer (20) and etching the a gap-fill oxide layer (22), the protective oxide layer (20) is formed to encapsulate and to protect the metallurgy lines (14), and the protective oxide layer (20) is not removed to expose the metallurgy lines (14) for protecting the metallurgy lines (14) even in etching process.

However, the method for gap filling between metal-metal lines provided by the present invention just includes a first dielectric layer deposition step, removing the first dielectric layer to expose the sidewalls and a second dielectric layer deposition step. The object of the present invention is to fill the gap between metal-metal lines without voids. Therefore, after forming a first dielectric layer on a surface and a side wall of the metal lines, a portion of the first dielectric layer is removed to expose the sidewalls of metal lines to prevent the formation of the voids in the gap between metal-metal lines. Thus, the method of the present invention and the method disclosed by Wang et al. '606 have different object and different process. The method disclosed by Wang et al. does not disclose the step of removing portion of the first dielectric layer to expose the sidewalls of metal lines.

Besides, in the step of removing the first dielectric layer of the present invention, the remained first dielectric layer on metal lines is with a geometric shape by removing portion of the first dielectric layer. However, in the step of etching the a gap-fill oxide layer (22), the remained gap-fill oxide layer (22) is planar by etching, not with a geometric shape. Thus, the removing step of the present invention is different from the etching step disclosed by Wang et al. '606.

According above-mentioned interpretation, the method of the present invention is different from the method disclosed by Wang et al. '606, and the method of the present invention is not disclosed by Wang et al. '606. Therefore, the rejection of claim 1 can be traversed, and the rejections of claims 5-7 can be traversed because

of their dependency.

**CLAIM REJECTIONS- 35 U.S.C. SECTION 103(a)**

Claims 2-4 stand rejected under 35 U.S.C. 103(a), as being unpatentable over Wang et al. (U.S. Patent No. 5,679,606) in view of and Lee et al. (U.S. Patent No. 6,103,630).

Examiner is of the opinion that the features recited in claims 2-4 have been disclosed and taught by the combination of Wang et al. '606 and Lee et al. '630. According to the interpretation of "**CLAIM REJECTIONS- 35 U.S.C. SECTION 102(b)**" the method of the present invention is different from the method disclosed by Wang et al. '606, and the method of the present invention is not disclosed by Wang et al. '606. It is the removing step of the present invention is different from the etching step. Therefore, claim 1 is not disclosed and taught by Wang et al. '606 and the combination of Wang et al. '606 and Lee et al. '630. The rejection of claim 1 can be traversed, and the rejections of claims 2-4 can be traversed because of their dependency.

Claims 8-18 stand rejected under 35 U.S.C. 103(a), as being unpatentable over Wang et al. (U.S. Patent No. 5,679,606) in view of and Kim at al. (U.S. Patent Application Publication No. 2004/0119170).

Examiner is of the opinion that the features recited in claims 8-18 have been disclosed and taught by the combination of Wang et al. '606 and Kim at al.. According to the interpretation of "**CLAIM REJECTIONS- 35 U.S.C. SECTION 102(b)**" the method of the present invention is different from the method disclosed by Wang et al. '606, and the method of the present invention is not disclosed by Wang et al. '606. It is the removing step of the present invention is different from the etching step. Therefore, claim 1 is not disclosed and taught by Wang et al. '606 and the

combination of Wang et al. '606 and Kim et al.. The rejection of claim 1 can be traversed, and the rejections of claims 8-18 can be traversed because of their dependency.

Claims 20 and 24-26 stand rejected under 35 U.S.C. 103(a), as being unpatentable over Wang et al. (U.S. Patent No. 5,679,606) in view of and Hsu et al. (U.S. Patent Application Publication No. 2003/0211697).

Examiner is of the opinion that the features recited in claims 20 and 24-26 have been disclosed and taught by the combination of Wang et al. '606 and Hsu et al.. According to the interpretation of **"CLAIM REJECTIONS- 35 U.S.C. SECTION 102(b)"**, we know that the removing step of "removing said first dielectric layer until a portion of said side wall of said plurality of metal lines are exposed by a second high density plasma, wherein a portion of said first dielectric layer with a geometric shape is on some of said metal lines" recited in claim 1 of the present invention is not disclosed by Wang et al. '606. Claim 20 of the present invention also recited that a portion of said first dielectric layer is removed to form a portion of the first dielectric layer with a geometric shape remained on some of the metal lines, like recited in claim 1. Thus, the features recited in claim 20 are not disclosed and taught by Wang et al. '606, and they can not be taught by the combination of Wang et al. '606 and Hsu et al.. Therefore, the rejection of claim 20 can be traversed and the rejection of claims 24-26 can be traversed because of their dependency.

Claims 21-23 stand rejected under 35 U.S.C. 103(a), as being unpatentable over Wang et al. (U.S. Patent No. 5,679,606) in view of and Hsu et al. (U.S. Patent Application Publication No. 2003/0211697) and further Lee et al. (U.S. Patent No. 6,103,630).

Examiner is of the opinion that the features recited in claims 21-23 have been disclosed and taught by the combination of Wang et al. '606, Hsu et al. and Lee et al.

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'630. According to foregoing interpretation, the feature of removing a portion of the first dielectric layer is removed to form a portion of the first dielectric layer with a geometric shape remained on some of the metal lines is not disclosed and taught by the taught by the combination of Wang et al. '606 and Hsu at al.. Therefore, the rejection of claim 20 can be traversed and the rejection of claims 21-23 can be traversed because of their dependency.

### **Conclusion**

Applicants respectfully submits that all pending Claims 1-18 and 20-26 as currently presented are in condition for allowance. Applicants have thoroughly reviewed that art cited but relied upon by the Examiner. Applicants have concluded that these references do not affect the patentability of these claims as currently presented. Accordingly, reconsideration is respectfully requested.

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Respectfully submitted,

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